DOCUMENT RESUME

ED 137 121 SE 022 353

AUTHOR	Campbell, Patricia; Virgin, Albert
TITLE	A Survey of Elementary School Teachers' & Principals' Attitudes to Mathematics and Utilizing Mini-Calculators.
INSTITUTION	North York Board of Education, Willowdale (Ontario).
SPONS AGENCY	Ontario Dept. of Education, Toronto.
PUB DATE	Jul 76
NOTE	27p.; For related document, see SE 022 352
EDRS PRICE	MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS	*Administrator Attitudes; Curriculum; *Educational Research; Elementary Education; *Elementary School Mathematics; Instruction; Mathematics Education; Objectives; *Surveys; *Teacher Attitudes
IDENTIFIERS	*Calculators; Research Reports

ABSTRACT

Investigator-constructed questionnaires were distributed to fourth-, fifth-, and sixth-grade teachers and to elementary school principals in order to determine their attitudes toward the use of calculators in the mathematics program. One hundred eighty-three teachers and 64 principals responded. Results showed that the three most frequently cited teaching objectives for mathematics included understanding basic concepts, practicality, and the development of logical reasoning skills. Other objectives included proficiency in problem-solving, computational skills, and an enjoyment and interest in mathematics. Just over half of the teachers did not think the use of a calculator would help them realize their teaching objectives. Advantages and disadvantages of the calculator were cited. Almost half of the teachers surveyed felt that the calculator could be introduced between grades 4 and 6, while 44% indicated a preference for after grade 6. More than half of the principals thought that students should display at least average proficiency before being able to use a calculator. The majority of principals agreed that the community should be informed if calculators are going to be used in the schools and 40 principals would anticipate a "mixed" community reaction. The results of this study suggested that teachers and principals are not unlike in their attitudes toward the use of calculators in the classroom and are consistent in identifying similar advantages and disadvantages of using calculators. A copy of both of the teachers' and the principals' questionnaires is included in the appendices. (DT)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED137121

U S DEPARTMENT OF HEALTH, EDUCATION & WELFARE
NATIONAL INSTITUTE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

NORTH YORK BOARD OF EDUCATION

RESEARCH REPORT

A SURVEY OF ELEMENTARY SCHOOL TEACHERS' & PRINCIPALS' ATTITUDES TO MATHEMATICS AND UTILIZING MINI-CALCULATORS

Patricia Campbell & Albert Virgin

July, 1976

This study was funded by the Ministry of Education for the Province of Ontario

Under the Grants-in-Aid of Educational Research Program

2

SE 022 353

TABLE OF CONTENTS

	Page Number
PURPOSE	1
SAMPLE	1
PROCEDURE	1
RESULTS	
TEACHER QUESTIONNAIRE	2
PRINCIPAL QUESTIONNAIRE	10
SUMMARY	12
APPENDIX A	
APPENDIX B	

Purpose

The purpose of the study was to determine the attitudes of elementary school teachers and principals to the use of mini-calculators in mathematics programs.

During the seventies, and particularly during the last two years, the pocket or mini-calculator has infiltrated the consumer market. Its accessibility both in terms of cost and general availability suggests that increasing numbers of households will contain a mini-calculator. Predictions are that the mini-calculator market will reach the saturation point by 1980.

This prediction has implications for the public school system and for mathematics programs specifically.

Sample

A sample of one hundred teachers from each of grades 4,5 and 6 was selected at random from computer lists of elementary teachers. All elementary school principals (N=116) were surveyed.

Procedure

In early May, the selected teachers were asked to complete a 30-item questionnaire (see Appendix A) regarding their mathematics experiences, their math program and pocket calculators.

A 16-item principals' questionnaire (see Appendix B) was distributed at the same time. The two questionnaires were developed in consultation with the Co-ordinator of Mathematics, Mr. John Del Grande, Mr. Neil Brodie, Assistant Superintendent of Schools and Mr. John Welch, Vice-Principal. Some of the items incorporated in the questionnaire were based on other curriculum surveys. Several interested principals and teachers participated in a pilot trial and minor revisions were made on the basis of their responses.

Results

The teacher questionnaires were analyzed initially by grade and then any questions that had similar responses from all three grade levels were collapsed to form one table. There was about a 60% return in each grade level (grade 4 - 56 questionnaires, grade 5 - 61 questionnaires and grade 6 - 66 questionnaires) therefore the grand total of questionnaires returned was 183.

The principal questionnaires were analyzed as a group and where appropriate, their responses were compared with those of teachers. The total number of questionnaires was sixty-four, a 55% return.

Teacher Questionnaire

Nearly two-thirds of the teachers who completed the questionnaire had taught for more than five years.

Most of the teachers had had mathematics experiences previous to and during their teaching career, as shown in the following table.

Which of the following mathematics experiences have you had?

University Courses	Teacher's College Courses	Summer School Courses	Professional Development	Ministry Courses	School Board Courses	Other	No Answer
48.1%	92.9%	6.6%	54.6%	6.0%	15.8%	1.1%	1.6%

In response to the question "How much do you enjoy teaching mathematics?", the following responses were given.

Very Much	Quite a Bit	All Right/ Not Bad	Not Very Much	Not at All
48.1%	35.0%	15.3%	1.1%	0.5%

In the following table, the open-ended responses were coded into seven categories.

What do you feel is the most important objective(s) in teaching mathematics?

Objectives	No. of Responses
Understanding the basic concepts.	96
Practicality - being able to apply math to everyday situations.	46
To be able to think and reason logically.	40
Problem solving.	28
Mastering computational skills.	25
Proficiency (speed and accuracy) - competence	17
Enjoyment and interest in mathematics.	16
No answer	5
Other	3

How often do you teach mathematics to your pupils?

Once a Week	2-3 Times a Week	Every Day
0	4.4%	95.6%

The preceding table indicates that the majority of teachers surveyed teach mathematics every day. The following table indicates the approximate length of the math classes.

Responses	10-20 Minutes	20-30 Minutes	More than 30 Minutes
Grade 4	3.6%	28.6%	67.8%
Grade 5	1.6%	18.0%	80.3%
Grade 6	1.5%	16.7%	81.8%

Two-thirds of the grade 4 teachers stated that their math classes are more than 30 minutes long and just under 30% of the classes are 20-30 minutes in duration. In the previous question, four grade 4 teachers stated that they taught mathematics 2-3 times a week. Of these four, three teach their students mathematics for a period of 20-30 minutes and the other teacher teaches for more than 30 minutes.

The majority of the grade 5 and 6 teachers (over 80%) teach mathematics for more than thirty minutes. One teacher in grade 5 and three teachers in grade 6 stated that they taught mathematics 2-3 times a week and four teach mathematics for more than thirty minutes to their students.

In the next two questions, teachers were asked how many classes they devote to measurement and geometry.

How many classes do you devote to geometry - that is the study of shape, etc.?

Responses	Less Than 10	10-20	20-30	30-40	No Answer
Grade 4	35.7%	39.3%	17.8%	3.6%	3.6%
Grade 5	14.8%	60.6%	21.3%	3.3%	-
Grade 6	13.6%	57.6%	22.7%	4.5%	1.5%

It is evident that more classes are devoted to geometry in grades 5 and 6 than in grade 4.

How many classes are devoted to measurement?

Responses	Less Than 10	10-20	20-30	30-40	No Answer
Grade 4	18.2%	49.1%	27.3%	5.4%	1.8%
Grade 5	15.0%	56.6%	23.3%	5.0%	1.7%
Grade 6	12.9%	61.5%	15.4%	7.7%	4.6%

As grade increases, there is a slight increase in the amount of time spent studying topics related to measurement.

In your opinion, how many of your pupils enjoy mathematics?

All of Them	Most of Them	About Half of Them	Few of Them	None of Them
1.6%	81.4%	15.8%	1.1%	-

Over 80% of the teachers reported that "most" of their pupils enjoy mathematics, while only 62% felt that "most" of their pupils were competent in the fundamentals of mathematics.

In your opinion, how many of your pupils are competent in the fundamentals of mathematics?

All of Them	Most of Them	About Half of Them	Few of Them	None of Them	No Answer
1.6%	61.7%	32.2%	3.8%	-	0.5%

When asked to rank several math divisions in terms of their importance, 89% of the teachers said that arithmetic was "most important" while 74% reported that geometry was "least important".

	Most Important 1	2	3	Least Important 4	No Answer
Geometry	-	5.5%	17.5%	73.8%	3.3%
Arithmetic	89.1%	6.0%	0.5%	0.5%	3.3%
Measurement	-	15.3%	66.7%	15.3%	3.3%
Problems	7.6%	69.9%	12.0%	7.1%	3.3%

Teachers were asked to rank order the following subjects in terms of teaching difficulty.

EASE OF TEACHING

Subject	Most Difficult 1	2	3	4	5	6	7	Easiest 8	No Answer
1) Math	3.8%	5.5%	6.0%	7.1%	11.5%	18.6%	25.1%	15.3%	9.8%
2) Reading	2.2%	7.1%	9.8%	16.4%	17.5%	10.4%	13.7%	11.5%	9.8%
3) Phys. Ed & Health	3.8%	16.9%	10.4%	9.3%	9.8%	12.6%	12.6%	15.8%	9.8%
4) Language	3.3%	8.2%	13.1%	16.9%	14.6%	14.6%	10.9%	8.7%	9.8%
5) Social Studies	2.7%	7.1%	21.3%	15.8%	13.7%	11.5%	9.3%	8.2%	9.8%
6) Art	7.6%	20.8%	8.7%	11.5%	5.5%	9.3%	9.8%	15.8%	9.8%
7) Science	18.0%	16.9%	14.2%	9.8%	12.0%	7.6%	6.6%	3.8%	9.8%
8) Music	48.6%	7.6%	6.6%	3.3%	5.5%	5.5%	2.2%	10.9%	9.8%

Again, since the responses of all three grades were similar, they were combined to form the above table. The subjects have been listed in their order of teaching ease, with mathematics being the easiest to teach, and music the most difficult.

When asked which subject they found the hardest to make interesting, 57 of the teachers mentioned language, 31 mentioned music, 20 mentioned math, 18 mentioned science and 17 mentioned social studies.

The next set of questions dealt with the use of pocket calculators. Seventy-eight percent of the teachers surveyed had personally used a pocket calculator but only 23% had used one with their students. Thosewho had used it with their students did so for the following reasons:

- checking answers
- mechanics of operating a calculator
- reinforcing a concept such as repeating decimals
- enrichment and game situations
- facilitate long and difficult arithmetic operations.

In response to the question "Do you feel that the calculator will help you achieve your teaching objective(s)?", 56% of the teachers said "no", 33% said "yes" and 11% did not respond to the question. The majority of teachers who responded negatively felt that the student should learn and understand concepts and operations on his own and therefore did not need a calculator. Teachers who responded positively felt that the calculator was a motivational tool that could be used to increase calculation speed and accuracy and to check and follow-up their work.

Though the majority of teachers do not feel that the calculator will help them achieve their teaching objectives, the same percentage felt that the pocket calculator has a place in elementary math programs, while just over a third disagreed. The reasons that were given are listed below.

Comment	No. of Responses
If teachers responded "yes".	
1. Use calculator as a checking device.	31
2. Enrichment for those students who know basics.	30
3. Saves time - can do rapid calculations.	16
4. For long involved questions.	11
5. It's fun - encourages participation.	11
6. Learn the mechanics of it- why people use them.	6
7. Challenges pupils - problem solving and logical thinking.	3
8. As a form of drill to learn the basics.	3
9. It reflects the modern age.	2
10. Gives more time for other subjects.	1
If teachers responded "no"	
1. Don't want students to become dependent on it.	13
2. Concepts should be drilled (orally, games).	12
3. Proficiency needs to be stressed.	9
4. Develop the brain first.	7
5. Students get enough challenges from school work.	1
6. It's a playtoy.	1
Other	10
No answer	46

To what extent can the calculator be used as a motivational tool?

	A Great Deal	Quite Often	Some-times	Rarely	Never	No Answer
Grade 4	10.7%	33.9%	39.3%	10.7%	1.8%	3.6%
Grade 5	6.6%	26.2%	50.8%	11.5%	1.6%	3.3%
Grade 6	16.7%	34.8%	37.9%	3.0%	3.0%	4.5%

More grade 6 teachers stated that they thought the calculator could be used at least "quite often", than the other two grade levels. Half of the grade 5 teachers thought that they could be used only "sometimes".

Ninety percent of the teachers felt that the calculator could be used as an effective checking device, while 7% did not and 3% did not respond to the question.

To what extent can the calculator be used as a diagnostic tool by the teacher?

	A Great Deal	Quite Often	Some-times	Rarely	Never	No Answer
Grade 4	7.1%	14.3%	37.5%	10.7%	10.7%	19.6%
Grade 5	1.6%	23.0%	29.5%	11.5%	6.6%	27.9%
Grade 6	7.6%	15.2%	43.9%	19.7%	4.5%	9.1%

Approximately 20% of the teachers in each grade level thought that the calculator could be used "a great deal" to "quite often" as a diagnostic tool. Just under half of the grade 6 teachers stated that it could be used "sometimes" in this manner and 20% said it "rarely" could be used. Quite a few teachers in grades 4 and 5 did not answer this question.

When asked whether the calculator had advantages in addition to those of a diagnostic and motivational tool, 78 teachers did not respond, while 39 said that there were no further advantages. Of those who did answer the question, the following additional advantages were listed:

- saves time, enabling pupils to do a variety of questions
- provides instant feedback; encourages pupils to check work
- provides enrichment; encourages creativity
- builds self confidence
- prepares student for computer age
- useful for remedial work

To what extent do you think that the calculator detracts fro , the learning of basic number facts?

	A Great Deal	Quite Often	Some-times	Rarely	Never	No Answer
Grade 4	42.8%	19.6%	16.1%	7.1%	3.6%	10.7%
Grade 5	27.9%	14.8%	21.3%	11.5%	1.6%	23.0%
Grade 6	27.3%	18.2%	36.3%	10.6%	1.5%	6.0%

While the majority of teachers expressed the feeling that the calculator would detract from learning basic number facts at least "sometimes" or more frequently, this feeling was more pronounced in grade 4 than in grades 5 and 6.

Sixty-one percent of the teachers felt that pupils should achieve a high level of proficiency in computation skills before being able to use a calculator, 31% felt pupils should achieve an average level and 1% felt pupils could use the calculator even with a low level of proficiency. Seven percent did not respond to this question.

Other disadvantages of the calculator mentioned by the teachers referred primarily to the idea that pupils would become too dependent on the calculator, it would become a crutch for the poorer student, and would detract from a good pupil-teacher relationship.

In your opinion, can some concepts be taught better by using the calculator?

	Yes	No	No Answer
Grade 4	17.8%	66.1%	16.1%
Grade 5	37.7%	29.5%	32.8%
Grade 6	27.3%	45.4%	27.3%

The responses to this question seem to be related to grade level, although they should be viewed with some caution as a large percent of the respondents did not answer this question.

The teachers who stated that some concepts could be taught better by using the calculator were asked to list them. The following responses were given:

- decimals
- percent
- multiplying and dividing
- square roots and exponents
- value concepts
- large numbers

The teachers felt that the calculator could be used in other school subjects. For example:

- in the study of volume and weight in science
- in social studies for population densities, mapping distances, checking statistics
- in consumer education and accounting courses
- in art and physical education

When asked at what grade level pocket calculators should be introduced, of those who responded, 7% mentioned grade 3 or earlier, 47% mentioned grades 4-6 and 44% indicated after grade 6. A few teachers did not mention a specific grade, but mentioned skills that a child should have, e.g., when a pupil can do his own work.

Forty-six percent of the teachers felt that pupils should "rarely" or "never" be allowed to bring a pocket calculator from home to use in math classes, while 10% felt they could do so at least "quite often".

Fifty-eight percent of the teachers felt that the Board should not be responsible for providing schools with calculators, while 34% felt they should.

However, 60% of the teachers felt that programs and materials based on information about calculators should be developed and integrated into the present school format, while 25% did not and 14% did not answer the question. When asked to elaborate further on their responses to this question, teachers gave the following responses.

Comment	No. of Responses
1) Need guidelines - workshops.	46
2) Introduce at high school level.	13
3) They are a waste of time, fuss, little value.	10
4) Too expensive for the benefits gained.	7
5) We need to utilize them in our programs because children are using them already.	7
6) Should be available on an optional basis - as an aid to the existing math program.	5
7) Make new material available to public.	2
8) Will encourage pupils to use them effectively and will check against the misuse of calculators.	2
Other	27
No answer	67

Principal Questionnaire

Nineteen of the 64 principals who responded have Board-owned calculators in their schools; eight have less then 5, nine have 5-15 and two have more than 15 calculators. Five indicated that they used the calculators daily, seven used them at least weekly and at the other extreme, three principals indicated that they were never used. The remaining principals did not respond.

Ten principals indicated that student-owned pocket calculators are in their school. When asked to elaborate, the principals indicated that very few students brought calculators, and they were used infrequently.

Forty-eight of the principals, however, did think that the pocket calculator has a place in the elementary math program. The reasons given were very similar to those of the teachers, e.g.,

- as a checking device
- for enrichment
- as a motivational tool.

Twelve of the principals felt the pocket calculator should be introduced by grade 2,while 25 suggested grades 3-6 and 13 felt the junior or senior high level would be more appropriate. On the other hand, eleven of the respondents felt that the calculator should be introduced when it is appropriate to the teacher's goals and the basic skills have been mastered.

Responses to the question "To what extent do you think the calculator detracts from the learning of the basic number facts?", were divided into three groups. Approximately one-third felt that such is the case "quite often", another third felt this was the case only "sometimes" and the third group felt that the calculator would "rarely" or "never" detract from the learning of basic number facts.

Fifty-five principals felt that the calculator could be used as a checking device, while 29 felt that it could be used often as a motivational tool and 15 felt that it could be used often as a diagnostic tool.

When asked whether they felt there were any other advantages in using calculators in the math program, approximately one-third of the principals did not respond. Among those who did respond, the largest number felt that the calculator could be used in problem solving, number processes and in the learning of concepts. Several others felt that they freed the student from tedious calculations. Quite a few stated that by using them in the math programs we would be introducing the student to the machine as a part of society and showing them how to use it.

What could be the disadvantages of using calculators in the math programs?

Disadvantages	No. of Responses
1) Misuse - calculators will become a crutch and student will become too dependent.	20
2) Students will lose computational proficiency - won't learn facts.	19
3) Cost.	8
4) Theft, damage.	7
5) Parental concern, predjudice.	5
6) Teachers unorganized.	4
7) If used as a substitute for learning basics.	3
8) Uncontrolled access and use.	2
9) Computational speed not developed.	1
10) Use with present math programs questionable.	1
Other	5
No answer	11

The majority of the principals stated that if the calculator is misused so that it becomes a crutch or the student becomes too dependent on it, then it would be a disadvantage to their math programs. A second disadvantage that they stated was that students will lose their computational proficiency.

Twenty-six principals felt that students should be very proficient in computation before they use a calculator, while 12 principals felt only average proficiency was necessary and seven felt that even students with low proficiency could use the calculator.

A number of principals did not answer this question directly, but wrote in a variety of responses, e.g.:

- It depends on the student. If he is incapable of a high level of proficiency he could use the calculator for motivation, checking and as a learning experience.
- It depends on the reason for introducing the calculator.
- Calculators can be used at all levels depending on the teacher's objectives for helping the child.

Thirty-seven principals felt that the calculator could be used in other subject areas of the curriculum, e.g., science, geography, physical education, outdoor education, social studies.

Fifty-one of the 64 principals agreed with the policy of informing the community when calculators are going to be used in the school, and forty would predict that the reaction of the community would be mixed, i.e., some parents agreeing and some opposing.

Fifty principals felt that programs and materials should be developed about calculators for integration into the present program, however, only 33 principals would be willing to buy calculators for their school from the school budget.

Summary

This study was designed to determine the attitudes of elementary school teachers and principals toward the use of mini-calculators in mathematics programs. Self-made questionnaires were distributed to 100 teachers from each of Grades 4, 5 and 6 and to a total of 116 elementary school principals. Questionnaires were received from 183 teachers (representing a 60% return in each grade level) and from 64 principals (a 55% return) and where appropriate, responses between the two groups were compared.

The three most frequently cited teaching objectives for mathematics included understanding basic concepts, practicality and the development of logical reasoning skills. Other objectives included proficiency in problem-solving, computational skills, and an enjoyment and interest in mathematics. Over 80% of the teachers reported enjoyment in teaching mathematics and a similar percentage reported this interest in their students. Only 62%, however, felt their students were competent in the fundamentals of mathematics.

Most teachers (78%) had made personal use of a calculator, but only 23% had used it with their students.

Just over half of the teachers did not think the use of a calculator would help them realize their teaching objectives. Of those who responded positively (33%), the calculator was perceived to be a motivational tool that could be used to increase calculation speed and accuracy, to check and follow-up computations, and to provide enrichment for students competent in the basics. In addition to its use as a diagnostic and motivational tool, the calculator was reported to have other advantages: time-saver; instant feedback; encourages creativity; builds self confidence, prepares student for computer age and useful for remedial work.

Certain disadvantages of using calculators in the classroom which were mentioned by teachers included: student dependence on it; an undermining of the importance of independent understanding of concepts and operations, and general proficiency. While the majority of teachers thought that the calculator would detract from learning basic number facts at least "sometimes" or more frequently, this feeling was more pronounced in Grade 4 than in Grades 5 and 6.

Generally, teachers thought that the teaching of decimals, percent, multiplying, dividing, square roots, exponents, value concepts, and large numbers could be facilitated by using calculators and that they could be very practical in other school subjects (eg. science, social studies, business courses, art, physical education).

Almost half of the teachers surveyed felt that the calculator could be introduced between Grades 4 and 6, while 44% indicated a preference for after Grade 6.

Although 46% of the teachers opposed the use of calculators brought from home in the classroom, 60% of the teachers supported the development and integration of programs and materials based on information about calculators into the present school format. Specifically, they mentioned the need for guidelines and workshops in this area and the introduction of calculators for classroom use at the high-school level.

Forty-eight of the 64 principals who supported the use of calculators in the elementary math program cited reasons similar to those of teachers.

Twelve principals felt the calculator could be introduced by Grade 2, 25 suggested Grades 3-6 and 13 thought the junior or senior high level would be more appropriate. Eleven would leave the timing of introduction to the teacher's discretion, that is, when it is appropriate to the teacher's goals and the student has mastered the basic skills.

Principals also cited disadvantages of using calculators similar to those mentioned by teachers. More than half of the principals thought that students should display at least average proficiency before being able to use a calculator.

More than half of the principals identified subject areas of the curriculum, outside of mathematics, similar to those mentioned by teachers in which the calculator could effectively be used.

The majority of principals (51) agreed that the community should be informed if calculators are going to be used in the schools and 40 principals would anticipate a "mixed" community reaction.

Fifty principals supported the development and integration of programs and materials about calculators in the present program, but only 33 would be willing to purchase calculators from their school budget.

The results of this study would suggest that teachers and principals are not unlike in their attitudes to the use of mini-calculators in mathematics programs. Both groups are consistent in identifying similar advantages and disadvantages of using calculators in the classroom and although some concerns are expressed, the majority of teachers and principals favour the development and integration of more resources associated with calculators into the current school program.

APPENDIX A

TEACHER QUESTIONNAIRE

APPENDIX A

ELEMENTARY MATHEMATICS RESEARCH PROJECT

PART A

To what grade or grades do you presently teach Mathematics?

a) Grade 4 ☐ b) Grade 5 ☐ c) Grade 6 ☐

Please answer this questionnaire in terms of the experience you have had at this grade level

1. How long have you been teaching?

   a) 5 years or less ☐ b) More than 5 years ☐

2. Which of the following Mathematics experiences have you had?

   a) University courses ☐ b) Teachers' College courses ☐

   c) Summer School courses ☐ d) Professional Development ☐

   e) Ministry courses ☐ f) School Board courses ☐ g) Other ☐ _____ (please specify)

3. How much do you enjoy teaching Mathematics?

   a) Very much ☐ b) Quite a bit ☐ c) All right/ not bad ☐

   d) Not very much ☐ e) Not at all ☐

4. How often do you teach Mathematics to your pupils?

   a) Once a week ☐ b) 2-3 times a week ☐ c) Every day ☐

5. Indicate the approximate length of your Math classes

   a) 10-20 Mins. ☐ b) 20-30 Mins. ☐ c) More than 30 Mins. ☐

6. Is measurement part of your Math. Program?

a) Yes ☐ b) No ☐

If "Yes"

How many classes are devoted to measurement?

a) less than 10 ☐ b) 10-20 ☐ c) 20-30 ☐ d) 30-40 ☐

7. How many classes do you devote to Geometry - that is the study of shape, etc.

a) less than 10 ☐ b) 10-20 ☐ c) 20-30 ☐ d) 30 or more ☐

8. In your opinion how many of your pupils enjoy Mathematics?

a) All of them ☐ b) Most of them ☐ c) About half of them ☐

d) Few of them ☐ e) None of them ☐

9. In your opinion, how many of your pupils are competent in the fundamentals of Mathematics?

a) All of them ☐ b) Most of them ☐ c) About half of them ☐

d) Few of them ☐ e) None of them ☐

10. Rank order the following Math. Divisions. Give 1 to the most important.

a) Geometry b) Arithmetic c) Measurement d) Problems

11. Rank order the following subjects in terms of teaching difficulty for you. Give a 1 to the most difficult subject to teach and 8 to the easiest subject to teach.

a) Music ☐ b) Phys. Ed. & Health ☐ c) Math. ☐ d) Science ☐

e) Language ☐ f) Social Studies ☐ g) Art ☐ h) Reading ☐

Which subject do you find the hardest to make interesting? _____

12. What do you feel is the most important objective(s) in teaching Mathematics?

_____

_____

_____

_____

13. Have you personally used a pocket calculator?

a) Yes ☐ b) No ☐

14. Have you ever used pocket calculators with your students?

a) Yes ☐ b) No ☐

If "Yes", please explain briefly _____

_____

_____

15. Have your students had any other experiences with pocket calculators in your classroom?

a) Yes ☐ b) No ☐

If "Yes", please explain briefly _____

_____

_____

16. Do you think that the Pocket Calculator has a place in Elementary Math. Programs?

a) Yes ☐ b) No ☐

Please explain: _____

_____

_____

17. At what grade level should pocket calculators be introduced into the school system?

_____

18. To what extent do you think that the calculator detracts from the learning of the basic number facts?

a) A great deal ☐ b) Quite often ☐ c) Sometimes ☐

d) Rarely ☐ e) Never ☐

19. To what extent can the calculator be used as a motivational tool?

a) A great deal ☐ b) Quite often ☐ c) Sometimes ☐

d) Rarely ☐ e) Never ☐

20. To what extent can the calculator be used effectively as a diagnostic tool by the teacher?

a) A great deal ☐ b) Quite often ☐ c) Sometimes ☐

d) Rarely ☐ e) Never ☐

21. Are there any other advantages in using calculators in your Math. Programs?

_____

_____

_____

_____

_____

22. In your opinion what level of proficiency should students reach in computation before they use a calculator?

a) High ☐ b) Average ☐ c) Low ☐

23. In your opinion can the calculator be used as an effective checking device?

a) Yes ☐ b) No ☐

24. In your opinion can some concepts be taught better by using the calculator?

a) Yes ☐ b) No ☐

If "Yes", which ones _____

_____

_____

_____

_____

25. How often do you feel that students should be allowed to bring a pocket calculator from home to use in their Math. classes?

a) A great deal ☐ b) Quite often ☐ c) Sometimes ☐

d) Rarely ☐ e) Never ☐

26. Do you feel that the Board should provide calculators for your class?

a) Yes ☐ b) No ☐

If "Yes", how often during the school year do you use them? _____

27. Do you feel that the calculators will help you achieve your teaching objective(s) as you listed in Question 12?

a) Yes ☐ b) No ☐

Briefly explain your answer _____

_____

_____

_____

28. What could be the disadvantage of using calculators in your Math. Programs?

_____

_____

_____

29. How could the calculator be used in other subjects within the school curriculum?

_____

_____

_____

_____

_____

_____

30. Do you feel that programs and materials based on information about calculators should be developed and integrated into the present school format for teachers to use?

Yes ☐ No ☐

Please elaborate: _____

_____

_____

_____

_____

_____

THANK YOU FOR YOUR CO-OPERATION

APPENDIX B

PRINCIPAL QUESTIONNAIRE

APPENDIX B

ELEMENTARY SCHOOL PRINCIPALS'

QUESTIONNAIRE ON MATHEMATICS

1. Are there Board owned pocket calculators in your school?

   (a) Yes ☐ (b) No ☐

   If "Yes"

   (a) How many? _____

   (b) How often are they used?

   (i) Daily ☐ (ii) Weekly ☐ (iii) Monthly ☐ (iv) Never ☐

2. Are there student owned pocket calculators in the school?

   (a) Yes ☐ (b) No ☐

   If "Yes"

   (a) How many? _____

   (b) How often are they used?

   (i) Daily ☐ (ii) Weekly ☐ (iii) Monthly ☐ (iv) Never ☐

3. Do you think that the pocket calculator has a place in Elementary Math programs?

   (a) Yes ☐ (b) No ☐

   Please explain your answer: _____

   _____

   _____

4. At what level should pocket calculators be introduced?

   _____

   _____

   _____

   _____

5. To what extent do you think that the calculator detracts from the learning of the basic number facts?

(a) A great deal ☐ (b) Quite often ☐ (c) Sometimes ☐ (d) Rarely ☐

(e) Never ☐

6. To what extent can the calculator be used as a motivational tool?

(a) A great deal ☐ (b) Quite often ☐ (c) Sometimes ☐ (d) Rarely ☐

(e) Never ☐

7. To what extent can the calculator be used as a diagnostic tool by the teacher?

(a) A great deal ☐ (b) Quite often ☐ (c) Sometimes ☐ (d) Rarely ☐

(e) Never ☐

8. Do you feel there are any other advantages in using calculators in the Math programs?

_____

_____

_____

_____

9. In your opinion, what level of proficiency should students reach in computation before they use a calculator?

(a) High ☐ (b) Average ☐ (c) Low ☐

10. In your opinion, can the calculator be used as an effective checking device?

(a) Yes ☐ (b) No ☐

11. Would you invest part of your school budget in purchasing calculators for your school?

(a) Yes ☐ (b) No ☐

12. What could be the disadvantage of using calculators in the Math. programs?

_____

_____

_____

_____

13. Do you agree with the policy of informing the community of the use of calculators in your school?

(a) Yes ☐ (b) No ☐

14. Could you predict the reaction of the community?

(a) Agreeable ☐ (b) Opposed ☐ (c) Mixed ☐

15. Do you feel that the calculator could be used in other subjects within the school curriculum?

(a) Yes ☐ (b) No ☐

If "Yes",

How could it be used? _____

_____

_____

16. Do you feel that programs and materials based on information about calculators should be developed and integrated into the present school format for teachers to use?

(a) Yes ☐ (b) No ☐

Please elaborate: _____

_____

_____

_____

_____

THANK YOU FOR YOUR CO-OPERATION